United Nations E/CN.17/IFF/1999/14

Economic and Social Council

Distr.: General
18 February 1999

Original: English

Commission on Sustainable Development
Intergovernmental Forum on Forests
Third session
Geneva, 3–14 May 1999

Programme element II.d (vii)

Matters left pending and other issues arising from the programme elements of the Intergovernmental Panel on Forests process

Issues that need further clarification: future supply of and demand for wood and non-wood forest products

Report of the Secretary-General

Summary

The broad introduction of the paradigm of sustainable forest management provides recognition of the enormous breadth and value of forest contributions to society. At the same time, the implementation of sustainable forest management will also formalize, to a degree, the true extent of demands placed upon forests. Forest management will be required to encompass broad economic, environmental and social dimensions, and often to resolve competing or conflicting demands between these dimensions. In many instances, this is likely to require marked changes in the provision of goods and services from specific tracts of forest, and over time the net result at the global scale may be a substantial reconfiguration in forestry patterns, systems and structures.

If the future for forestry under sustainable management is epitomized by change, then it is also important that the consequences of change be anticipated. As increasing local, national, regional and international attention is focused on the contribution of forests to a variety of global environmental systems, it is important to consider the effects of policies on the ability of forests to satisfy demands for goods and other services.

99-04564 (E) 180399

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I. Mandate and scope

A. Mandate

1. At its first session, the Intergovernmental Forum on Forests (IFF) emphasized the need to build on the results of the Intergovernmental Panel on Forests (IPF). The Forum defined programme element II.d (vii) as follows:

> *"Consider other issues arising from the programme elements of the IPF process needing further clarification ... inter alia ...* future supply of and demand for wood products and non-wood forest products and services" (see E/CN.17/IFF/1999/4, para. 7, category II (d)).

2. The present report is based on input provided by the Food and Agriculture Organization of the United Nations (FAO) as lead agency for this topic within the informal high-level Inter-Agency Task Force on Forests, as well as an in-kind contribution by the Government of the United States of America.

B. Scope

3. The present report recalls the conclusions and proposals for action of IPF related to this topic. It provides an overview of issues associated with demand for and supply of wood and non-wood forest products (NWFPs), and gives particular attention to the role of policies in assuring both conservation of forests and their continuing role in providing goods and services. The report looks at the consumption of the goods and services provided by forests, and how through such consumption the contribution of forests to economic and social development provides a powerful motivation for the management, conservation and sustainable development of all types of forests. The report explores some of the central issues in sustainable forest management, such as what types of forests support consumption, as well as management and production methods, in particular for wood. As increasing local, national, regional and international attention is focused on the contribution of forests to global environmental systems, the report also considers the effects of policies on the ability of forests to satisfy these demands for goods and services.

II. Introduction

4. There is broad agreement that demands on forests will continue to increase. Population growth and increasing incomes and wealth in many countries can be expected to increase demand for the commodities and services that forests provide. Comparison of recent studies, addressing demand for and supply of wood raw material and wood-based products, reveals general agreement on the magnitude of likely increases and near-term trends in consumption and production. Most studies agree that at the global level, wood raw material supplies are — and will continue to be — broadly adequate to meet requirements for wood-based manufactured products. No study foresees plentiful wood supplies, however, and some studies identify regional and local difficulties in meeting anticipated demand for some types of wood.

5. The greatest certainty is that the future will involve changes for forests and the forestry sector, and that some of these changes will be profound. The key challenge for forest stakeholders and policy makers is to understand and manage these changes. It appears that the future will not be one of stark, unpleasant choices between preserving forests and meeting ever-increasing demands for basic commodities. The future will, however, require many other choices because sustainable forest management at its core is about choice: sustaining what and for whom.

6. Sustainable forest management will be the product of public choice, and will consequently reflect social values. A greater variety of participants and more challenging questions will lead to a more complex policy context for forestry. Similarly, the forest sector cannot be isolated from a broader sustainability framework that includes all natural resources and land uses (especially agriculture), as well as industries and trade. Thus, the need to facilitate public consultation and discussion to determine a workable framework for implementing sustainable management, within this complex web of interrelationships, means that there is an apparent need for more effective forest policy institutions. At the local and national levels, these institutions must promote more effective dialogue among interested parties on the objectives for forest management, and must implement decisions that are better coordinated across sectors of national economies and among countries. It is clear that policy tools that can accomplish more complex objectives must also join the standard policy tools used in many countries to manage commodity production. This is one of the ways in which information on outlooks for demand and supply and improved analysis of trends in demand and supply can help countries to achieve the

objectives that emerge from increased local, national and international interest in forests.

7. A challenge for many countries is that forest resource data are incomplete, obsolete or otherwise inadequate to enable robust analysis of the long-term consequences of specific policy scenarios on production and consumption of wood and non-wood products. Thus, while at a global level it is reasonable to be confident that wood supplies are adequate to meet future requirements, the supply situation is often much less clear in regional, national or local contexts. Global analyses are generally too unwieldy to consider the nuances of a range of specific policy decisions and the effects these may have on future wood supplies. There are also difficulties in predicting the detailed interaction of markets, technology, and developments in other sectors and the effects of these interactions on local demand and supply.

8. A central message is that it is possible to create a desirable future by shaping and guiding the forces of change. Better information and better institutions are the key tools that will lead to better outcomes.

III. Guidance from previous discussion

9. Direct consideration of future supply and demand for wood products and non-wood products did not appear as a programme element of IPF. However, information on this topic was presented to IPF, and the conclusions and proposals for action included in the final report of IPF illustrate the importance of demands on forests and efforts to meet those demands through public policies and private actions. In their final report, participants in IPF:

(a) Recognized the importance of long-term changes in consumption and production patterns in different parts of the world, and their positive and negative effects on the sustainable management of forests;

(b) Recognized that the long-term outlook is for steadily rising demand for wood products and other forest goods and services;

(c) Urged countries to assess long-term trends in supply and demand for wood, and to consider actions to promote the sustainability of wood supply, with an emphasis on investment in sustainable forest management and strengthening of institutions for forest and plantation management;

(d) Urged countries to recognize and enhance the role of planted forests as an important element of sustainable forest management that complements natural forest management;

(e) Urged countries to address critical research needs related to supply and demand, including trends in supply and demand and the potential for multipurpose trees in supplying wood and NWFPs.

10. Discussions at sessions of IFF continue to reflect recognition of the importance of forests in meeting future demands and needs for products and services. In the report of the second session of IFF, participants noted:

(a) The need for additional information on the forest resources of all countries, with an emphasis on improved quality and comparability, and the importance of this information in assessing the ability of forests to meet future demands for products and services;

(b) That international support is required to enable developing countries to build the human and institutional capacity to conduct assessments of forest resources and contribute to analyses of supply and demand;

(c) The role of planted forests in easing pressure on natural forests, and the need for accurate information on rates of growth and the implications for supply of wood and non-wood products of increases in protected areas;

(d) The need to identify policy implications, at the national and international levels, resulting from information on the outlook for supply and demand.

IV. Overview and issues in supply of and demand for wood and non-wood products and services

11. Several studies of global supply and demand of wood and wood products have recently been produced. These have all contained projections of wood and wood-product supply and demand of roughly the same order of magnitude. In contrast, however, many of the studies have arrived at different conclusions about the adequacy of forest resources to meet the wood raw material requirements underlying their forest product demand projections. Most of the studies broadly agree that at the global level, raw material supplies will expand to meet production requirements. However, none of the studies foresee plentiful wood supplies, and several have suggested that it may be difficult to meet future requirements in some regions or for some types of wood. This leads to an expectation that trade in forest products will continue and may increase in importance, even if some developing countries may encounter difficulties in satisfying

domestic demand from external sources due to financial constraints.

12. The information base for NWFPs is very weak and the products are heterogeneous. Thus, developing a systematic global assessment for the outlook of demand and supply for NWFPs is a major task and one that necessarily needs to be broken into components. Important questions arise as to how management for NWFPs can be incorporated into the model for sustainable management of forests, particularly when few of these products have been inventoried, and the costs and technical difficulties of developing globally comprehensive inventories are prohibitive. There is an equivalent absence of adequate information and analysis of demand for and the ability of forests to provide services at the local, national and international levels.

13. Issues addressed in the present report include:

(a) *Information on forest resources*. Resource data, including information on the area of various types of forests, and their inventories of wood and other commodities, is one of the foundations for any analysis of future supply;

(b) *Availability of forests for commodity production*. Because much of the world's forest-based wood fibre is currently unavailable for commercial use, the outlook for supply must take into account factors affecting availability, including wood supply economics and regulatory policies;

(c) *Industrial wood*. Harvesting of wood as an industrial raw material has been and will continue to be an important use of forests;

(d) *Woodfuels*. Consumption for fuel constitutes the single largest demand (in global volume terms) for wood;

(e) *Non-wood forest products*. The fundamental issues and challenges for most NWFPs are closely related to their diversity, the small scale of their production, their limited significance in markets, and their lack of development in an industrial sense;

(f) *Services provided by forests*. Services cover a wide range of ecological, economic, social and cultural considerations and processes. This diversity means management solutions will be necessarily more complex when service considerations are incorporated in decision-making;

(g) *Pricing*. Inappropriate pricing structures are often a fundamental cause of undesirable outcomes. Ensuring that price signals and behavioural incentives are appropriately aligned will be a crucial component of successfully implementing sustainable forest management;

(h) *Role of the private sector*. A substantial portion of the world's forests are in private sector hands, and almost half of the world's wood production is from privately owned forests. Government policies must necessarily consider private sector responses;

(i) *Need for capacity-building*. Increasing complexity in the forest management and policy environments mean increasing demands on institutional and human resource capacities. Enhancement of skills, training and institutional strengthening will be requirements to successfully manage change.

A. Resource information

14. The world's forests cover roughly one quarter of the Earth's land area, or a total of 3.5 billion hectares (ha). By far the largest portion of this area (97 per cent) is natural or semi-natural forest, while the remainder (3 per cent) is plantation forest. This resource provides the bulk of industrial wood supplies. In addition to this area, however, another 1.7 billion ha carry some tree or woody vegetation. This area is classified as "other wooded land", and contributes substantially to fuelwood production.

15. The world's forest area is diminishing at the rate of 0.3 per cent per annum (average loss during 1990–1995 period), largely due to conversion to agriculture and intense use pressures. There is substantial global variation in the change of forest area. Deforestation is proceeding most rapidly in Africa, which lost 0.7 per cent of its forest area annually during this period. In contrast, the area of forest grew by 0.1 per cent in Europe.

16. Gross forest area data provide a measure of the extent of the resource, but only part of this area is available for wood production. A significant portion of the forest area is unavailable for wood supply because it is in legally protected areas (national parks, reserves etc.), it is not economically viable to harvest (too far from markets, transport links, infrastructure etc.) or otherwise constrained (due to physical inaccessibility, such as steep slopes or swamps, or regulatory constraints, such as general logging or harvesting bans). While it is estimated that only half of the total natural (and semi-natural) forest area is currently available for wood production as a consequence of economic and physical inaccessibility, there are no apparent constraints in production and consumption at the global level.

17. This raises some interesting issues related to the supply of all types of forest goods and services. Much of the legally unavailable land is in parks or other reserves, and is thus

permanently set aside from commercial exploitation. However, these areas do provide biodiversity and other services, such as water regulation, soil retention, scenic and cultural values. One policy trend that is firmly in place is the continuing withdrawal of forest land from harvesting. A number of countries have recently announced and/or implemented measures that removed significant areas of forest from wood harvesting. It is expected that more area will be removed from the commercially available landbase as more countries increase the extent of protected forest areas.

18. Changing economic conditions (e.g., rising wood prices) may, however, allow economically unavailable land to become accessible over time or lead to the realignment of protected area boundaries. While some of these lands may be relatively unproductive (which is part of the reason that they are unavailable), other forests are physically remote. This is the case in, for example, much of South America, where 82 per cent of the natural forest is considered unavailable. These remote forests could be maintained in a remote state to provide non-wood values or they can be accessed and contribute to wood supply. There are a great number of policy options that could be implemented to achieve a range of potential outcomes.

19. The degree of "naturalness" of forests is also changing gradually over time, and a continued shift from natural forest to semi-natural or planted forest can be expected in areas available for commercial wood harvesting. This transition has largely run its course in Europe, where 85 per cent of forests are considered semi-natural. The manner in which sustainable forest management is implemented will affect the distribution of the intensity of management across a country or a region but it is unlikely to halt or reverse the trend to increased levels of management. Thus, more forest can be expected to shift from natural to semi-natural or plantation status.

20. Area data provide some sense of the potential quantity of products that can be produced from the forest. However, forest productivity and forest condition have a significant impact on output levels. Improving measurement and control of forest degradation is, consequently, of substantial importance in ensuring the long-term sustainability of wood supplies. The crucial measure of short-term wood production potential is the commercial growing stock (the volume of commercial wood in the forest). In the longer term, net growth rates are the decisive biological factor. The most rigorous estimates suggest that the long-term sustainable yield in commercially available forests will be sufficient to sustain modest increases in harvests above the current level. Regional capacities to sustain increases, however, vary quite markedly. The extent to which commercial uses can be found for non-commercial species, the extent to which more intensive management of forests (including plantation establishment) can raise harvest yields and the reduction of waste through better harvest techniques are the most important variables in sustainably increasing the amount of wood delivered from forests to mills.

21. Plantation forestry provides perhaps the most important opportunity to increase long-term production of wood since it constitutes the most intensive form of management for wood production. Although plantations make up only approximately 3 per cent of total forest area, they currently provide about 13 per cent of the world's wood supply. Industrial plantations provide 25 per cent of the industrial harvest volume, and planted fuelwood species contribute 4.5 per cent of total global fuel production. These proportions will rise over time as plantations that have already been established come on stream, and as genetic and management improvements result in faster growth. A major challenge for plantation forestry is to increase production of the range of other forest values within the context of increasing wood yields.

B. Industrial wood raw material

22. Demand for forest products, taken in aggregate, has increased successively during the past few decades. Global consumption of industrial wood products has grown substantially, with the volume of industrial wood harvested from the world's forests increasing from 1.16 billion cubic metres (m^3) to 1.44 billion m^3 (25 per cent) between 1970 and 1990. Since 1990, the apparent demand for industrial roundwood has actually declined by an average of 2 per cent per annum, though much of this reduction relates to disruption in reporting systems in the former USSR. The reductions are also, to some extent, a reflection of reduced consumption rates for sawnwood, more efficient utilization in the manufacture of all wood products and greater use of recycled fibre.

23. Sawnwood consumption has been relatively stagnant since 1970 due to a combination of increasing prices as a consequence of scarcity of sawlog-quality raw material, the encroachment of substitute products, especially wood-based panels and engineered wood products, and limited growth opportunities in a mature product market. Conversely, growth in production and consumption of wood panel products and paper has been spectacular (consumption of both products has approximately doubled). Growth in roundwood consumption has been slower than growth in the

output of products derived from it (sawnwood, panels, pulp and paper). This trend is due to gains in efficiency and greater reliance on recycled material and residues. Low conversion efficiency remains a problem in many developing countries; however, gains in processing efficiency in many industrialized countries, coupled with increasing use of recovered or non-wood fibre in pulp and paper manufacture, have helped to moderate global demand for wood raw material from forests.

24. Demand for wood and forest products is largely driven by increases in population and general economic development, which is an indicator of industrialization. Between 1970 and 1994, the world population rose by 50 per cent, with increases of 60 and 90 per cent in South America and Africa. At the same time, the per capita consumption of all wood (including fuelwood) has changed little since 1950, standing now at roughly 0.6 m^3 per person per year.

C. Fuelwood

25. While industrial roundwood consumption is the most widely reported component of wood use, increases in fuelwood use are reported to have outstripped increases in the use of wood for industrial purposes. From 1970 to 1996, estimated global demand for fuelwood increased by 58 per cent to 1.86 billion m^3. Developing countries produce and consume about 90 per cent of the world's fuelwood and charcoal, and these fuels are the major household energy sources in many of these nations. On a global basis and based on these estimates of fuelwood production, the proportion of the total wood harvest used as fuel rose from 48 per cent in 1970 to 55 per cent in 1996. This ratio varies significantly among regions. For example, 75 to 80 per cent of the roundwood harvested in the Asia and Pacific region is used for fuel; in Africa, 91 per cent of the total (estimated) harvest is used for fuel.

26. Both production and consumption of fuelwood occur largely in informal sectors, meaning that fuelwood usage is generally poorly tracked and reported. The majority of household fuelwood is collected from non-forest areas, and therefore the assessment of sustainable production needs should also consider whether resource degradation is occurring outside the forests.

D. Non-wood forest products and services

27. Sustainable forest management has broadened the perspective of forest management far beyond the traditional focus on fibre yields to emphasize the importance of social, ecological, cultural and other economic values. While in the past the contribution that forests make in terms of non-wood values has been implicitly recognized, sustainable forest management is an attempt to incorporate these values explicitly into management objectives. A major challenge, because the concepts are largely new, however, is that comprehensive time-series data sets relating to newly developed indicators of sustainable forest management are rare.

28. NWFPs include a diverse array of goods, such as food products (fruit, nuts, game, mushrooms etc.), building materials (e.g., bamboo, rattan), medicines, fibres and other goods of cultural or spiritual significance. Data for most NWFPs are scarce and often inconsistent. They therefore form an unreliable basis for future projections. Nonetheless, there is considerable evidence that NWFPs are both socially and commercially important, particularly for people living in or close to forests. At the same time, collection, processing and distribution of NWFPs provides substantial employment and subsistence in some regions.

29. Developments that will have a significant effect on the outlook for NWFPs include whether efforts to commercialize NWFPs and move them away from subsistence usage are successful; the extent to which traditional forest dweller systems are disrupted by development; and whether increasing prosperity affects the numbers and habits of forest-dependent people.

30. Forests have long been a setting for tourism and recreation, and the eco-tourism sub-sector, which is heavily forest dependent, is frequently cited as one of the fastest growing service sectors in the world. Forests have also long been maintained to regulate water supply and to purify it. More recently, there is serious discussion concerning the use of forests to sequester carbon. Biological diversity has vaulted to the top of many forest managers' priority lists, and conserving biodiversity will probably require that there be further changes in how forests are managed. One of the interesting questions is how different tracts of forest land will be valued in the future and whether the recognition of these other values will cause shifts in wood harvesting approaches.

E. Pricing

31. Prices play a significant role in the availability of wood and other forest products. Higher prices typically encourage higher levels of production or gathering (for naturally occurring, non-wood commodities). For wood and managed

non-wood commodities, higher prices also lead to investment in forest management, including intensification. In addition to their role in encouraging changes in levels or types of production, prices also influence the efficiency of use (in harvesting or gathering, and in consumption). Increases in the cost of wood fibre from forests, along with increases in the costs of waste disposal and changes in public attitudes and preferences, have contributed to increasing use of recovered fibre in wood-based products. This trend has had a moderating effect on wood prices, and has had a significant effect on the level of demand for wood from forests.

32. Markets for wood and other forest products are also often substantially affected by government policies. These effects are both direct and indirect, and in some cases may lead to overproduction and in others to inappropriate restrictions on harvesting and management. In some cases, Governments are owners, managers and producers of wood, and in others they establish the conditions under which the private sector operates to grow, harvest and manufacture products derived from forests.

33. Prices of forest products and wood raw materials tell an interesting and important story for both policy and management. This is especially true as greater emphasis is placed on markets and the private sector as a foundation for world economic and political policies. Over the long term, in many markets prices of forest products have generally increased in real terms (adjusted for inflation). However, this has not been a steady, continuous process. Periods of increasing prices — as has been the case in the 1990s — have been separated by periods of constant or declining prices — as in the 1980s. Although demand for industrial wood raw material is expected to increase in the future, changes in the product mix and changes in production technology and sources of raw material are likely to provide opportunities for production increases consistent with constant (or modestly increasing) prices.

34. While product prices — established for the most part by competitive forces in international markets — are not expected to increase over the next decade, the raw material prices paid by some producers are much more likely in increase in some regions. Although product markets are international and highly competitive, wood markets are much more regional and local, and in many cases are not open, competitive markets at all. Private forest owners and competitive markets account for as much as half of world industrial roundwood production. Governments control or directly influence the remainder of world wood production. Future conditions in product markets (especially the absence of significant price increases), combined with higher management and harvesting costs (in part to accomplish environmental objectives), will present notable challenges to wood owners, both public and private.

35. It is important to note that the use of prices and market processes as mechanisms to implement policies may exacerbate distributional issues associated with policies. Even if policies (for example, limiting consumption through higher prices and taxes) have reliable and unambiguous benefits in the effort to sustain ecological services, uneven distribution of the social and economic consequences is likely to make these policies unsustainable. Attention to these issues and adaptive policy responses are characteristics of sustainable policies, and they should be acknowledged. Although sustainable development has been presented as a general issue of inter-generational equity, there has been less attention to specific intra-generational equity issues associated with sustainable development and environmental policies, specifically sustainable forest management.

F. Role of the private sector

36. Private ownership of forests and the private sector in general will play an increasingly important role in managing forests and sustaining production of wood and non-wood products. In part, this will be a consequence of broader trends towards a greater role for the private sector in political and economic policies in many countries. However, private forests already account for nearly half of world wood production and this share will increase. The increasing importance of private owners and the trend towards reliance on market processes will present new and difficult challenges for choosing and implementing forest policies to achieve both wood and non-wood objectives.

37. In many countries, public ownership of forests predominates; however, even in these countries, the share of commodity production that originates from private forests is typically greater than their share of forest area. In addition, the private sector often plays a critical role in markets for raw material (including non-wood commodities) and in processing and manufacturing. Policies designed to achieve sustainable management of forests through production of wood and non-wood commodities must take into account the likely response of the private sector (typically through markets) to changes in the composition, quality and costs of commodities.

38. Changes in production of wood raw material have significant implications for investments in wood-based manufacturing. In many instances, changes in the nature of the resource will require significant industrial restructuring

and investment in new or upgraded technologies. For example, decreasing availability of large logs will be a constraint to plywood and sawmilling facilities with technology and equipment especially designed for large logs. Industrial policies related to industrial development and employment generation in the forestry sector should carefully consider the long-term fibre availability, appropriate silviculture, processing technologies and product mix, mill capacity, access to international markets and institutional support for human resources development. Policies should encourage industrial restructuring required to meet an adequate rate of return. These might include access to affordable financial resources, taxation incentives and encouraging mergers, but should also provide forestry sector review studies focusing on industrial development.

G. Capacity-building

39. To a significant extent, several of the most pressing forest policy issues have been created or exacerbated by weak institutional or human resource capacities. For example, many forestry institutions (particularly in developing countries) place great importance on production planning, assigning harvest rights, monitoring harvesting operations and enforcing associated regulations and arrangements, but neglect other topics, such as silviculture, land-use planning, research and training, and community relations. Furthermore, staff resources are typically being diverted from monitoring and control functions to be deployed in project activities providing higher remuneration to the staff concerned. Where institutional capacities are inadequate to properly fulfil these tasks, undesirable outcomes tend to be prevalent. In addition, the move towards sustainable forest management means that many of these functions as well as approaches to sustainable forest management generally have become increasingly complex, imposing far greater consultative and consensus-building requirements.

40. Similarly, human resource capacities have a significant impact on the supply side. Implementation of sustainable forest management, encouraging small and medium-sized enterprises development (e.g., increasing supply from trees outside forests) and general industry restructuring into more technologically complex processes will require tremendous human resource development.

41. The key constraint is the availability of financial resources. Capacity-building requires considerable and sustained financial commitment, as well as access to training expertise, new technologies, plants and equipment. Often, expertise and technology are held in the private sector, so that any transfer of proprietary technologies may involve loss of competitive advantage. Policies to address this issue require attention.

V. Conclusions and preliminary proposals for action

42. It should be noted that a number of the conclusions and proposals for action listed here are not new. In some cases they repeat or reinforce aspects of proposals of IPF or issues highlighted in previous IFF discussions.

43. The demand for and supply of wood and non-wood products and services of forests will continue to form the basis for the contribution of forests to economic and social development. The need for commodities, including but not limited to wood, will provide one of the powerful motivations for conservation and sustainable management of forests. Revenues that can be collected from the use of forest-based commodities and services will be one of the primary sources of funds that can be invested in sustainable forest management. At the same time, the types and levels of demands on forests must be consistent with the biological ability of forests to sustain these demands. Local, national and international policies must reflect an accurate understanding of the factors affecting demands on forests, and must reflect consistent, mutually supportive approaches to ensuring that efforts to meet these demands are consistent with sustainable forest management.

44. The general conclusion reached by most recent outlook studies that wood and wood fibre supplies are broadly adequate does not eliminate the need for forest policies and forest management. In fact, it is a future outlook that is, in many ways, considerably more challenging to policy makers than the somewhat simpler alternative of a wood fibre "crisis". In order to be successful in the future foreseen by most of the recent outlook studies, forest policy makers and mangers will require ideas, skills, and decision-making processes that they do not adequately have at present. Although there is a desire (perhaps even a hope) that someone will discover an unambiguous, technical answer to the question "what is sustainable forest management?" collective energies will be better spent by acknowledging that sustainable forest management will be what we choose to make it. How enduring and sensible those choices are will depend on the effectiveness and inclusiveness of the public choice processes used to arrive at the decisions. The sustainability of choices will depend on how well we are

able to understand the future implications of current trends, and how well we manage the process of change.

45. The outcome of a shift to sustainable forest management will inevitably involve compromise. It is crucial to recognize that the various social, environmental and economic dimensions of sustainable management will inevitably compete and conflict, as will the aspirations of the various stakeholders. For example, one strong message of the outlook for wood and non-wood products is that the combination of market developments and existing trends and policies will continue to shift the world's industrial wood fibre production from natural forests to managed forests, including plantations. The productivity gains achieved through intensified forest management will include enhancing abilities and capacities to conserve additional areas of natural forests. Such a process, of course, requires careful consideration of direct and indirect costs, including trade-offs between commodity production and the environmental services of portions of the world's forests. Attention must also be paid to both expected and unexpected social, economic, and environmental consequences of management.

Forest resource information

46. Reliable forest inventory data are essential in the analysis of trends in demand for and supply of wood and non-wood products, and in the ability to develop and implement policies. For many countries, however, forest resource data are inadequate, especially in their treatment of non-wood products and in measuring forest degradation. Inventories are also inconsistent across countries, and are therefore difficult to compare and combine in order to form internationally useful databases.

47. The Forum may wish to:

(a) Encourage countries to place more emphasis on the development of comprehensive natural resources inventory data. Efforts to increase the quantity, quality and comparability of data should be based on increased activities on the part of Governments, non-governmental organizations, the private sector and international organizations;

(b) Encourage industrialized countries to assist developing countries in building capacity to improve the scope and quality of data-collection and processing systems;

(c) Encourage countries to support the efforts of international agencies to conduct global surveys and compile statistics (e.g., the Food and Agriculture Organization of the United Nations (FAO) forest resource assessments) that support efforts by countries and the international community to move towards sustainable management. This support should take the form of timely contributions of data, and the provision of adequate resources to make assessments as reliable and as comprehensive as possible.

Industrial wood raw material

48. A variety of factors, including shifts in terms of the availability and quality of wood, are influencing the economic performance of the forest products industry. Industrial usage is constrained not by an inadequate quantity of wood in the forest but rather by legal, policy and economic limits on availability, which also affect the cost of raw materials. Alternative sources of fibre, such as from recycled paper and non-wood fibre, account for an increasing share of industrial fibre consumption. Furthermore, deforestation, past wood harvesting, the economic and other benefits of producing from relatively more uniform, lower cost, intensely managed and often private, forests, as well as the addition of natural forests to protected area systems, are leading to a gradual shift in the focus of wood harvesting from natural to semi-natural forests, plantations and trees outside forests.

49. The Forum may wish to:

(a) Encourage countries to recognize the role of forest plantations in easing pressure on natural forests, and the need for policies that encourage this development within a framework of policies to assure management, conservation and sustainable development of all types of forests and goods and services from forests;

(b) Encourage countries that plan to continue harvesting in natural forests to establish wood production integrated with other objectives relevant to sustainable forest management;

(c) Encourage countries to recognize the important and valuable role of the private sector, secure land tenure and appropriate tax policies as among the conditions and incentives for increased production of wood and non-wood commodities.

Fuelwood

50. Global consumption of wood as a fuel is estimated to be larger than industrial roundwood consumption in pure volume terms. Currently, however, fuelwood statistics are generally weak, and much work is required to accurately assess the impacts of fuelwood collection on forest resources, particularly on trees outside forests. Although data is weak, it can be concluded that for most of the world's

population, it is as a source of fuel that forests play their most important roles in social and economic development. Therefore, the factual basis of and policy responses to fuelwood issues must be improved.

51. The Forum may wish to:

(a) Encourage the systematic collection and reporting of information on patterns of fuelwood production and use, encourage international organizations to make improvements in fuelwood data a priority and encourage developed countries to make resources available to support this effort;

(b) Encourage the development of pilot studies in countries to more accurately assess the impacts of fuelwood collection on tree and forest resources;

(c) Encourage countries to focus attention on wood energy as an essential element in rural development and to incorporate wood energy as a crucial part of policy and planning exercises within the forestry, agriculture and energy sectors.

Non-wood forest products and services

52. Information on the non-wood resources of forests and the extent of demand for services of forests is generally scarce and poorly represented in the national resource inventories and forest management plans of most countries. Even in the best cases, only major NWFPs and services are considered. Although many countries, especially tropical countries, have a wealth of forest-based biological diversity, information on the quantity, uses, markets and property rights to these resources is limited for most countries. Similarly, the potential to capitalize on service opportunities, through such activities as eco-tourism, is generally poorly documented. Inadequate information contributes, among other things, to the loss of biological diversity, failure to capture the full range of benefits of forests, and in some cases, to unsustainable production of non-wood products and services.

53. The Forum may wish to:

(a) Encourage countries to give particular attention to the need to collect and report information on a broad range of non-wood forest products. Countries should be encouraged to collect and report information on quantities gathered and consumed, ownership, rights, and the importance of these products to rural and indigenous communities;

(b) Encourage countries to develop and implement policies designed to ensure sustainable production of non-wood forest goods, and to ensure that the benefits of increased commercialization of NWFPs are equitably distributed and contribute to management, conservation and sustainable development of all types of forests;

(c) Encourage countries to promote awareness of the benefits and values of services provided by forests and examine mechanisms for compensating the people who protect and provide them.

Prices

54. Policies that set or affect the prices of wood and non-wood products and services are among the most important regulators of demand and supply. In many cases, the contribution of production and consumption to the unsustainable management of forests is caused by or exacerbated by inappropriate pricing policies or other policies that distort the efficient operation of markets. Improved policies that result in better price signals and behavioural incentives, especially for products from natural forests, can discourage unsustainable levels of use and forest-degrading management practices, and can encourage improved management and utilization of forests and increased investment in research and plantation forestry.

55. The Forum may wish to:

(a) Encourage countries to review policies and decisions that have a direct effect on the price of products, especially products of natural forests, and encourage countries to recognize that inappropriately inexpensive supplies encourage overuse, waste, excess and inefficient manufacturing capacity and discourage sound management practices;

(b) Encourage countries to recognize the role of effective prices in providing sufficient revenues to support adequate investment in forests and forest-based industries;

(c) Encourage countries to provide timely, useful and comparable data on prices of wood and non-wood products to international organizations, such as FAO, for compilation and wide dissemination.

Role of the private sector

56. Private ownership of forests and the private sector in general will play an increasingly important role in sustaining production of industrial wood products. In part, this will be a consequence of broader trends towards a greater role for the private sector in political and economic policies in many countries. Private forests already account for about half of world wood production and this share will increase in the future. The increasing importance of private owners and the trend towards reliance on market processes will present new

and difficult challenges for choosing and implementing forest policies to achieve both wood and non-wood objectives.

57. The Forum may wish to:

(a) Encourage countries to recognize the importance of the private sector in owning forests and producing commodities, especially wood. This role for the private sector should be supported and encouraged within a framework of policies, incentives and regulations to ensure the management, conservation and sustainable development of all types of forests and sustained production of a wide range of goods and services;

(b) Encourage countries to strengthen measures in balancing national and social objectives with those of the private sector.

Capacity-building

58. A number of pressing forest policy issues have been created or exacerbated by weak institutional or human resource capacities. Where institutional capacities are inadequate to properly fulfil the tasks associated with sustainable forest management, undesirable outcomes tend to be prevalent.

59. The Forum may wish to encourage countries to recognize the critical need to build the capacity of institutions and personnel to implement sustainable forest management; and encourage international institutions and donor countries to emphasize training and capacity-building for sustainable forest management in their bilateral and multilateral support for forestry.